The technical matter useful to the special student of birds is found condensed in small type at the head of each discussion. This makes reference to the finer characters of each species easy, and at the same time segregates this formal matter from the more readable text following.

The plan of treatment of each bird follows a regular sequence: Technical portion (in small type): Accepted common and scientific names; other names; description: adult male, adult female, juvenile, downy young; marks for field identification; voice; nest; eggs; general distribution; distribution in California. Text (in large type): General and local distribution; migration; field marks; life history; nest, eggs, young; habits and behavior; food; economic value; present and probable future status.

Every one of the 108 native game birds of the state is described in detail, these including the ducks, geese, swans, ibises, cranes, rails, snipe, sandpipers, curlew, plover, quail, grouse, pigeons and doves. The localities in which each is found, and the times of the year when it is found, are designated and its life history and habits are accurately and well described.

Some of the life histories are unusually full—notably those of the commoner and more popularly known species; and while justice is done to the observations of previous workers, much new material of sterling worth is woven into the entire fabric of the book. Thus it is a substantial contribution to science—to the body of ascertained fact.

All through the book especial attention is given to those distinctive characters of a bird that help to make it recognizable from other species when alive, at a distance. A useful field manual is thereby provided. A dependable key to the various species makes possible the identification of any specimen in hand. The index contains all the common as well as the scientific names, thus making it easy to locate any bird, provided some name is known, even though this name be a very local, popular one.

Unquestionably the sixteen colored plates contribute very materially to the usefulness and attractiveness of the book. Thirteen are by Fuertes and the rest by Allan Brooks —all in the happiest vein of these accomplished artists. Twenty-one different game birds are figured in color, and the portraits are not only aesthetically satisfying, but eminently informative as well—two qualities which are not necessarily associated. The figures depict the birds in their characteristic, or usual, Californian environment—and let me emphatically state that these are no T-perch effigies, but real live birds, transferred in miniature to the printed page, retaining all the vitality of a "cinematic" likeness. For instance, feel the perceptible "honk" of the geese on plate 6, or the hurry of the rail stepping off on plate 9; or the quiet animation of the quail in plate 1, or the dynamic quality of the mudhens of plate 10. The ninety-four line drawings in the text serve largely to illustrate characters of plumage, bill, or feet, such as are especially helpful in identifying the different kinds of game birds.

Much credit is due to a Berkeley gentleman, whose name is withheld, and to Miss Annie M. Alexander for providing the "sinews of war"; to the former for supplying funds to carry on the economic work and to the latter "for the continued financial support, furnished in generous measure" to the Museum of Vertebrate Zoology, through whose opportunities the game bird book was brought to a conclusion.

Certainly everyone interested in California birds will wish to possess this book. If little has been said directly concerning the text, it has been because the reputation of the authors has seemed to the reviewer to render such special commendation superfluous. From Grinnell, Bryant, and Storer a high grade of work is a matter of course, since they stand high in the Bradstreet of ornithology. Theirs must be the satisfaction of craftsmen who have done something better than it has been done before; and they are to be congratulated for having so worthily represented their institution in the commemorative series of the Semicentennial of the University of California.—W. K. Fisher, *Hopkins Marine Station of Stanford University, Pacific Grove, California, February 8, 1919.*

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Some Recent Investigations on the Food of Certain Wild Birds. By Walter E. Collinge, D. Sc. F. L. S. The Journal of the Board of Agriculture, vol. xxv, September, 1918, pp. 668-691, 17 diagrams in text.

Under the above title, Dr. Walter E. Collinge, now the foremost economic ornithologist of Great Britain, throws new light on the economic value of nine species of British birds. The three main points made in the introduction are: Need for more knowledge on the food habits of birds, because of their direct relation to agriculture and food supply; the intricacy of the problem; the casual and unscientific manner in which the subject has been treated in the past. The

food habits of the same birds as are here studied were presented in a paper by the same author, published in 1913 under the title "The Food of Some British Wild Birds". The method used in the earlier paper in estimating the crop and stomach contents was that known as the numerical method. The present paper is the result of a re-investigation, using the volumetric method. Under the heading of methods, a discussion of the numerical as compared with the volumetric method is given, with the conclusion that the ratio of each element to the average capacity or cubic contents of the bird's stomach gives the most accurate idea of the relative proportions of each kind of food. It is pointed out that this method, so widely used in the United States, is here practiced for the first time in connection with British birds. An attempt is thus made to state in definite figures the actual percentages of the different kinds of food consumed by each species during a whole year. The evidence is presented after an examination of 3670 adult specimens obtained during each month of the year, and 595 nestlings.

The treatment under each species consists of introductory statements, followed by post mortem records, food of nestlings, and a conclusion based on the evidence as to the economic status of the species. The change in method leads the writer to change his stand regarding the economic status of the Missel Thrush. The judgment after a numerical analysis of the food led to the statement that the Missel Thrush "for four months in the year does more harm than is counterbalanced during the remainder of the year". The judgment after a volumetric analysis leads to the statement: "In spite of its depredations in fruit orchards, this bird must at present be regarded on the whole as beneficial".

It is pointed out that the House Sparrow is one of the best-known birds in history, probably being known to people of whom we have no written records. "When writing was invented the Sparrow was selected for the hieroglyphic symbolising enemy, and proofs of its destructive habits have been cited by certain authors showing that it has been the enemy of mankind for more than five thousand years". Investigation of the food habits of this bird does not alter the attitude taken many years ago. The Rook is shown to be more harmful than beneficial, in the present abundance of this species. The injury to seed corn and other crops by the Skylark is far outweighed by the benefits it confers in destroying injurious insects. The Green Woodpecker is shown to destroy large numbers of injurious insects and to seldom, if ever, attack sound trees. It is, therefore, "deserving of every protection". The injuries inflicted by the Sparrow Hawk "are considerably in excess of the benefits it confers, and in consequence it should be afforded no protection". The Kestrel is a bird "certainly deserving of very strict protection". The Wood Pigeon probably consumes 57 pounds of food per year. Of this about 35½ pounds is grain, clover, roots and pulse, 20½ pounds of weeds, grass, earth-worms, etc., and about one pound of slugs, snails and insects. The writer, therefore, advocates the destruction of this bird as a pest. The food habits of the Lapwing demonstrate the need for "prohibition of the taking or killing of this bird or its eggs throughout the year".

Of the nine species of wild birds the House Sparrow and the Wood Pigeon are shown to be distinctly injurious. Because of their abundance, two others, the Rook and the Sparrow Hawk, are also injurious. One, the Missel Thrush, although as a rule beneficial, is sometimes locally too numerous. The Skylark, the Green Woodpecker, the Kestrel and the Lapwing are highly beneficial. Strong repressive measures against the first category, the withholding of protection from those of the next two categories, and the strict protection of the four beneficial birds are advocated. The paper is illustrated by seventeen diagrams, showing the proportional amounts of the different kinds of food, and a bibliography, citing twenty-three papers, is appended.

Dr. Collinge in casting aside the numerical method for the American method of computing the stomach contents of birds makes it appear probable that the latter will be universally used in the near future, with the result that the work of economic ornithologists throughout the world will be directly comparable. Heretofore, because of the wide difference in method it has been practically impossible for Americans to profit by the work of Europeans.—HAROLD C. BRYANT, *Museum of Vertebrate Zoology, Berkeley, California, January 1, 1919.*

MINUTES OF COOPER CLUB MEETINGS

SOUTHERN DIVISION

SEPTEMBER.—The meeting of September 26, 1918, was called to order by President Miller, with members Daggett, Holland, Howard, Howell, Law, Mrs. Law, Lelande, Little, Owen, Reis, and Willett